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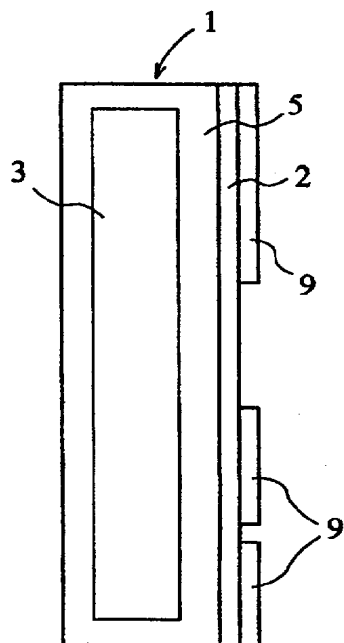
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(56) Documents Cited  
GB 2312955 A GB 2257367 A GB 2209388 A  
GB 2092744 A US 5223958 A US 4198920 A

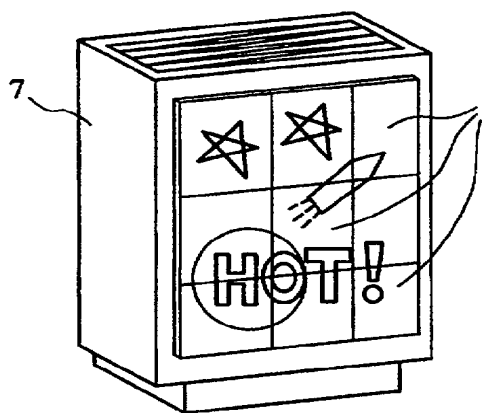
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(54) Abstract Title  
**Decorative panel for a radiator**

(57) A decorative radiator panel (1) is printed with heat/and or light sensitive ink. In particular, the radiator panel is preprinted with screen ink (2) and has heat and/or light sensitive ink (9) printed over the screen ink (2). Changes in the heat/and or light intensity cause changes to the heat and/or light sensitive ink (9) and thereby to the images visible on panel. When heat is applied, for example by heating the radiator, the heat sensitive (thermochromic) ink becomes transparent, revealing the underlying design, the word "HOT". The panel (1) is fixed to the radiator (7), preferably by magnets.



*Fig. 1*

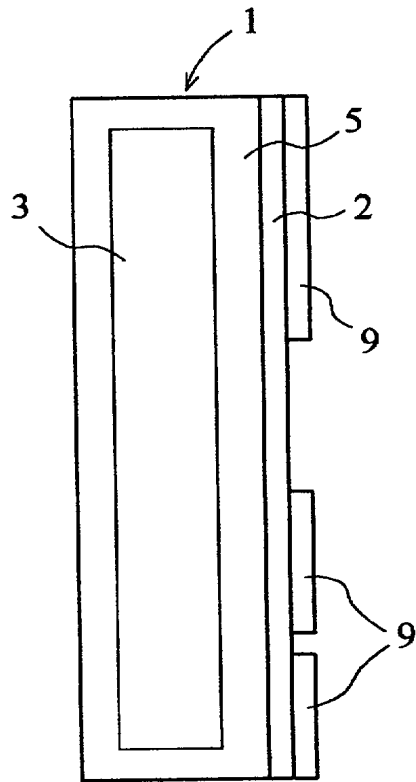


*Fig. 2B*

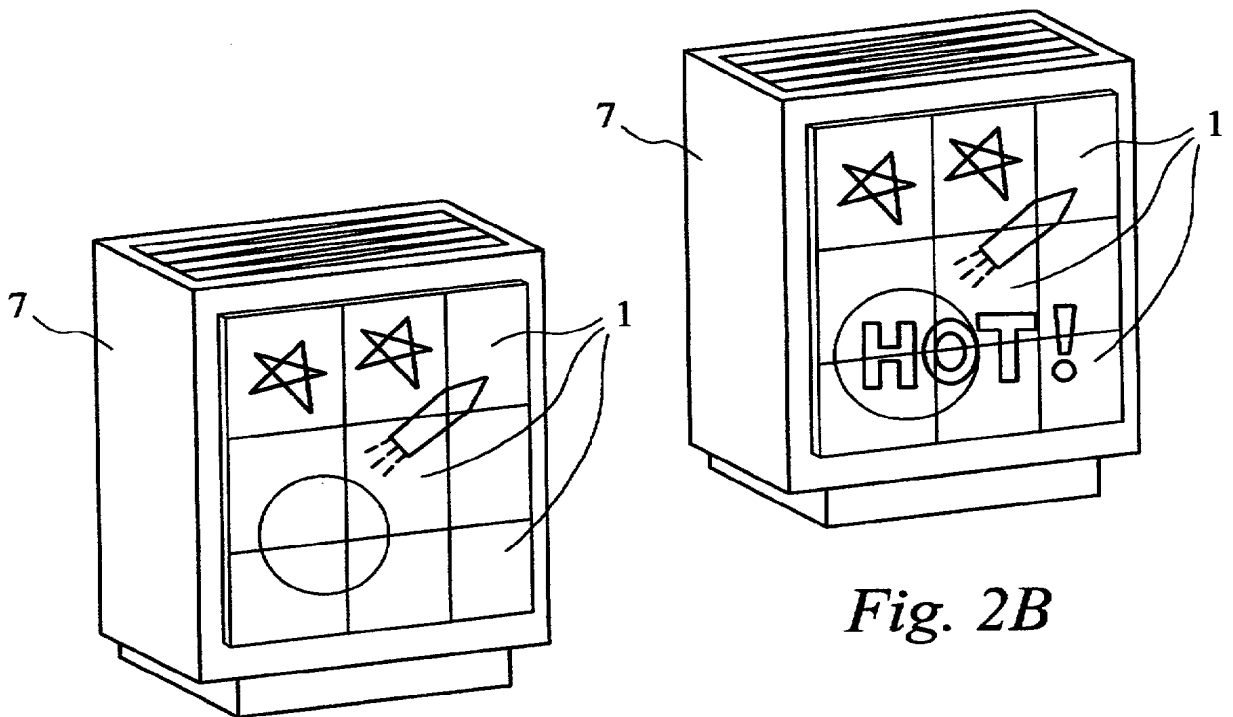
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

GB 2 351 550 A



*Fig. 1*



*Fig. 2A*

*Fig. 2B*

RADIATOR PANEL

The present invention is concerned with heating radiators. In particular, it is concerned with  
5 decorative panels which can be used in conjunction with heating radiators.

Conventional heating radiators comprise a series of pipes through which hot water passes. Heat is conducted from the hot water through the walls of the pipes of the  
10 radiator to heat the surrounding air. Normally, the surface temperature of the radiator is equivalent to or close to the temperature of the hot water within the radiator. As the temperature of the water used in a central heating system may be relatively high, for  
15 example greater than 80°C, the radiators may present a danger of burning to vulnerable individuals such as children, the elderly and the infirm.

To overcome this problem, low surface temperature (LST) radiators have been introduced, in which the  
20 radiator is enclosed within a metallic cabinet. In use, the surface temperature of the metallic cabinets are lower than the surface temperature of conventional radiators and so LST radiators are safer to touch, while still capable of producing sufficient heat to heat the  
25 surrounding room. LST radiators can be purpose-built or, alternatively, existing conventional radiators can be

adapted by enclosing the radiators within a cabinet designed to fit around them. However, although these LST radiators are effective in reducing surface temperature and hence are safer than conventional radiators, they are  
5 often perceived to be less attractive than conventional radiators.

In its most general terms, the present invention is concerned with decorative panels which may be fixed to heating radiators or may form an integral part of heating  
10 radiators. The panels are printed with a heat and/or light sensitive ink. Preferably the panels have a backing to which a suitable coating of e.g. vinyl is applied. The coating may then be preprinted with conventional screen ink prior to being overprinted using  
15 the heat and/or light sensitive ink. Changes in temperature and/or light intensity result in changes in the heat or light sensitive ink, thus permitting changes in images visible on the panels.

The panels should be light-weight enough to be  
20 easily handled. Preferably the panels are envisioned to be used in conjunction with LST radiators.

Preferably the backing plates are magnetic, and so can easily be affixed to a metallic radiator or radiator cabinet. The magnetic backing material can have a  
25 thickness of between 0.5 and 2mm. Alternatively other means may be employed to fix the panels to the radiators.

The panels may be provided as single panels which may cover a substantial part of a surface of the radiator or, alternatively, may be provided as smaller panels which may be used individually, used together as a set or  
5 interchanged with each other. In particular, it is envisaged that such a set of panels could be in the form of a magnetic jigsaw for children. In an alternative embodiment, the panels may form an integral part of an conventional radiator or an LST radiator cabinet.

10 An embodiment of the present invention will now be described in detail, by way of example only, with reference to the accompanying figures in which:

Fig. 1 shows a cross-sectional view of a radiator panel according to the invention

15 Fig. 2 shows a perspective view of a low surface temperature radiator to which a set of radiator panels according to the invention has been affixed.

As shown in Figure 1, a radiator panel according to the invention includes a coating layer comprising a self-  
20 adhesive vinyl sheet 5 mounted on a magnetic backing plate 3. The coating layer need not be made of vinyl and may be made of any material onto which screen inks can be printed e.g. paper. A surface of the vinyl sheet is decorated with a base design using screen ink 2. Any  
25 conventional screen ink suitable for printing onto the coating layer may be used. An example of such an ink is

Plastijet XG. Selected areas of the design applied with the screen ink 2 is overprinted using thermochromic ink 9 to form an overlying design.

The base design and overlying design may be applied to the vinyl before or after the vinyl sheet 5 is affixed to the backing plate 3.

In a cold state, the thermochromic ink is opaque. Any design underlying the layer of thermochromic ink will therefore not be visible. However, when heat is applied, the thermochromic ink reacts and becomes more transparent, thus revealing any image which may underlie it. Figure 2 shows an LST radiator 7 to which a set of radiator panels according to the invention are affixed. Fig 2a shows the radiator in a cold state with Fig 2b showing the same radiator in a warm state. The set of panels have a decorative design applied to the vinyl layers, using Plastijet XG ink. Part of the design is overprinted with thermochromic ink, which under cold conditions is opaque and so hides the underlying design. When heat is applied, by for example, heating the radiator, the thermochromic ink becomes transparent, revealing the underlying design, which, in the radiator panels shown in Fig. 2b, comprises the word "HOT".

The temperature at which the thermochromic ink changes from opaque to transparent may be determined by suitable selection of printing conditions and/or inks

during the manufacturing process. The source of heat which makes the ink change from an opaque state to a transparent state may originate from the radiator itself or from the ambient temperature. If desired, the ink can  
5 be selected to be transparent at a normal ambient temperature even if the heating radiator is not operational. It would also be possible to use a variety of thermochromic inks applied to the design in a number of steps under differing printing conditions to give  
10 different temperature characteristics in order that different areas of an illustration on a panel can be revealed at different temperatures. In this way, the invention may be used, for example, to indicate the approximate surface temperature of the radiator.

15 In an alternative embodiment of the invention, the thermochromic ink is replaced by light sensitive ink. In this embodiment, selected areas of the vinyl sheet are overprinted with light sensitive ink. In light conditions, the light sensitive ink is not visible but,  
20 in periods of darkness, the light sensitive ink luminesces. As a result, different images will be visible under dark conditions. The image visible during light conditions is determined by the illustration applied to the vinyl sheet using the conventional ink and  
25 the image visible in dark conditions is determined by the overprinted light sensitive ink. Of course,

thermochromic ink and light sensitive ink may be used together in the same radiator panels.



Claims

1. A radiator having radiator panel, which panel comprises a backing plate carrying a printed coating which coating comprises heat and/or light sensitive paint.
2. A radiator according to claim 1 wherein the printed coating comprises screen ink preprinted onto the backing plate, and the heat and/or light sensitive paint is printed over at least a part of the screen ink.
3. A radiator according to claim 1 having a non-printed coating on the backing plate and wherein the heat and/or light sensitive ink is printed over at least part of the non-printed coating.
4. A radiator according to claim 3 wherein the non-printed coating is preprinted with screen ink and the heat and/or light sensitive paint is printed over at least part of the screen ink.
5. A radiator according to claim 3 or claim 4 wherein the non-printed coating is vinyl.
6. A radiator according to claim 5 wherein the non-

printed coating is self adhesive vinyl.

7. A radiator according to any one of the preceding claims wherein the backing plate is magnetic.

8. A radiator according to any one of the preceding claims wherein the ink is heat sensitive ink and changes from opaque to transparent at a predetermined temperature.

9. A radiator according to any one of the preceding claims wherein the ink is light sensitive and changes from luminescent to invisible at a predetermined light intensity.

10. A radiator panel comprising a backing plate carrying a printed coating which coating comprises heat and/or light sensitive paint.

11. A radiator panel according to claim 10 wherein the printed coating comprises screen ink preprinted onto the backing plate and the heat and/or light sensitive paint is printed over at least a part of the screen ink.

12. A radiator panel according to claim 10 or claim 11 comprising attachment means for attachment to a radiator

or to a radiator cabinet.

13. A radiator substantially as described herein with reference to the accompanying drawings.

14. A radiator panel substantially as described herein with reference to the accompanying drawings.



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Application No: GB 9909789.1  
 Claims searched: All

Examiner: M C Monk  
 Date of search: 19 October 2000

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
 UK Cl (Ed.R): F4S (S41M4, S41M21): G1D (DH31A, DH31X, DH52)  
 Int Cl (Ed.7): F24D (19/06, 19/10): G01K (11/12, 11/16)  
 Other: ONLINE DATABASES: WPI, EPODOC, JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2312955 A	WILLET INTERNATIONAL LTD Consider whole document; see eg 'ink' ll.1-2 & 20-24 p.6, paras 3 & 4 p.7, and claims 4 & 5.	1,10 at least
A	GB 2257367 A	WILLIAM FREEMAN Temperature indicating means (10)	
A	GB 2209388 A	CLIVE WARD Magnets (11) holding a radiator panel in place.	
X	GB 2092744 A	ERNST SPIRIG Layer (12) changes colour; printed layer (14); backing (18).	1,10 at least
X	US 5223958	HYPERDESIGN INC Consider whole document; printed message (16) on the transparent film (11) ll.19-23 col 2 & 12-15 col 3; layer (12) of thermochromic material; supporting substrate (13). See figs.1 & 4.	10 at least
A	US 4198920	WILLIAM F RUSSELL Example of thermochromatic crystals being used to show a change in temperature.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



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**Application No:** GB 9909789.1  
**Claims searched:** All

**Examiner:** M C Monk  
**Date of search:** 19 October 2000

Category	Identity of document and relevant passage	Relevant to claims

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.